

SCIENCE AND TECHNOLOGY
COMMITTEE

THE ROUTES THROUGH WHICH
THE SCIENCE BASE IS TRANSLATED
INTO INNOVATIVE AND
COMPETITIVE TECHNOLOGY

MINUTES OF EVIDENCE

Wednesday 5 May 1993

Mr A J C Britton, Professor S J Prais and Mrs H Steedman

*Ordered by The House of Commons to be printed
5 May 1993*

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MINUTES OF EVIDENCE

TAKEN BEFORE THE SCIENCE AND TECHNOLOGY COMMITTEE

WEDNESDAY 5 MAY 1993

Members present:

Sir Giles Shaw, in the Chair

Mr Spencer Bastiste
Dr Jeremy Bray
Mrs Anne Campbell
Cheryl Gillan

Lynne Jones
Mr Andrew Miller
Mr William Powell
Sir Trevor Skeet

Examination of Witnesses

MR A J C BRITTON, Director of the National Institute of Economic and Social Research (NIESR), PROFESSOR S J PRAIS, Senior Research Fellow, NIESR, and MRS H STEEDMAN, Senior Research Fellow, NIESR, were examined.

Chairman

1. Thank you for responding to our invitation to come and give formal evidence. You will not be in the least surprised to learn that we have invited you to do so because of the research and studies that you have undertaken over the years. In particular, Professor Prais is very well known on this subject; and indeed Mrs Steedman has done much of the research herself. We have some set questions, but you will be aware that the Committee may put supplementaries as matters proceed. The first section we are going to look at concerns skills and the economy. Research conducted by NIESR in the past shows that Britain's poor level of skills training is hindering the introduction of new and more productive techniques, and it is also introducing some inflexibility in the labour force which itself appears to contribute to United Kingdom manufacturers finding it difficult to compete with low-wage countries. In your view, how much of the United Kingdom's problems in introducing high-technology and high-value added goods and processes can be ascribed to poor education and/or poor training?

(*Mr Britton*) Perhaps I may start by saying a little about the background to the work we have done and its relation to the question you put. I will then ask my colleagues to provide you with a fuller account of what we have to say on the subject. The research on which we are drawing has been conducted over a period of more than 10 years. It began with international comparisons of productivity, not specifically technology, that is, the measurement of output per head or hour in a number of different areas mainly, though not only, in the field of manufacturing. It is based both on a study of national statistics and actual visits to matched samples of plants. There are some particular industries or occupations about which we have been able to assemble a certain amount of expertise, but they are being taken as examples from which we hope it will be possible to draw more general conclusions. Indeed, they seem to be consistent with the sort of picture one can find by looking at comprehensive statistics from censuses. We started from a study of productivity generally but it soon became clear that one of the main distinguishing features of the comparison of British industry with

industry on the continent, particularly Germany, was the way in which training was organised and the resultant level of skills, particularly skills qualifications. The relationship between that and new technology is clearly central to your inquiry. I would start by mentioning two aspects. The first is to do with the flexibility of the labour force in acquiring new skills. It certainly appears that having been trained in one occupation to craftsman or technician level it becomes possible to make use of that attitude to work, if you like, and the idea of motivation to develop mastery of the particular production technique is in a sense transferable. One might think that someone who was very precisely trained to do one occupation would find it difficult to transfer to another, but the opposite seems to be true. General training is a necessary foundation on which more specialised techniques to deal with new technology can be built. The other point that I wish to emphasise is a fairly mundane one to do with the maintenance of machinery. In comparisons of matched samples of plant we frequently find that in Britain and on the continent the same type of machinery and production process is being used. But when one comes to measure output per head there is a significant margin of the order of 10 per cent and sometimes 50 per cent or more lower between comparable processes being carried out in the two countries. In some cases one can discern finer distinctions. One of the most important things seems to be whether there are people available on the shop floor who understand the new technologies sufficiently well to be able to maintain the machinery to a high standard so that time is not wasted when machines are not running.

(*Professor Prais*) Perhaps I may give a little more historical perspective to our research. You asked about the importance of a number of factors. To put it into perspective, in an earlier study in 1981 when we looked at Britain, Germany and the United States we asked wider questions, such as: What was the importance of size of plant? Were our plants or enterprises too small? Was there inadequate investment in machinery? We then got on to the question of the role of labour relations, training and education. At that time we concluded that the size of plant here was larger, and investment in machinery per employee was higher here than abroad, but the

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[Continued

[Chairman Contd]

real gaps were in the labour relations and vocational training. That was 10 years ago. Today, I would say that of those two factors labour relations has become of less significance. As far as the training issue is concerned, I would go back a little further and say that the main issues to be solved are training and basic schooling, both primary and secondary, if we are to have an economy of world class competing with the Japanese and Germans.

Mr Batiste

2. Correct me if I am wrong but you started with the proposition that basic training and education in school was lacking in output from schools. Clearly, you are pointing to a gap in comparable output in basic education in the primary and secondary education system. You are also pointing to a lack of skills. What specific skills are you talking about over and above the basic education you have described?

(*Mr Britton*) I think that the right distinction to draw is between a specific skill which is appropriate for a particular production process, or even for a particular firm, where the enterprise has every incentive to train its workers to a high standard, and general training which is transferable so that if one invests in general training one is raising the skill levels of that workers when one knows he can go elsewhere and use his skill. Where we see the deficiency is in training to craft level of the kind that used to be examined by City and Guilds, not training which is specific to a particular production process.

(*Professor Prais*) The earlier worry was that we were not training enough university graduates at the top level. That is no longer a worry. You have seen our figures in that respect. There remain questions as to whether within the graduate level we have enough engineers or too many arts graduates. Our main deficiency is at the middle level—the number of people training to become mechanics or electricians or qualified builders. That is where the problem lies. There are too few of those. Instead of the recent reforms increasing the number of people trained as broadly-based skilled craftsmen, they have focused on vocational qualifications, which I would prefer to call simple skills tests. They are not such as to develop a career based on broad secondary school leaving qualifications that lead to vocational qualification of the kind that could be considered as a basis for entering university, for those who want to go that far.

3. In your work you have contrasted the German system of training, which has an element of compulsion, with the American system that offers incentives to acquire training. Which of those do you consider to be more likely to be effective in the context of the United Kingdom?

(*Mr Britton*) It is not necessarily a choice. One can think of a system in which both incentive and regulation are involved. The system on the continent used to be one of compulsion in the sense that there was no alternative to staying on for some vocational training, in the same way that there was no

alternative to going to school. But in the German system as it has now developed it is not a matter of compulsion but tradition. If you like, there is an element of social compulsion. People are expected to do it and gain prestige, and they have to explain why they are not undertaking training rather than why they are. It is the relics of a system in which there used to be compulsion.

4. I understand the traditional argument in the context of Germany. I am talking of Britain as it is now in trying to address the shortfall that you have identified. From what you have said it is suggested that the Germans have moved away from the area of legislative compulsion towards peer group pressure and social expectations. In the context of Britain with its background it may be that only with financial and other incentives will we be able to build up to that position?

(*Mr Britton*) I think that it is perhaps better to stop short of absolute compulsion because you cannot force people to learn, and it is very difficult to have even a small minority disrupting the class because basically they are there as a result of the state forcing them to be there. But the combination of social expectations and strong incentive seems to me to be the most hopeful approach. I think that Britain is different from Germany, the latter having been through a period of compulsion. Britain has to start from a position in which for a period it has trained a very low proportion of the population.

(*Professor Prais*) The American example is difficult to quantify. I think that the French example is more instructive. There is no tradition of compulsion there and figures relating to incentives are of interest. If you look at how much more a skilled craftsman—up to City and Guilds standard—in Britain earns compared with an unskilled person, the gap is of the order of 25 per cent. It is much the same in Germany, we would say, as a result of their tradition of compulsion and social pressures. But in France, where that tradition does not exist, the earnings gap is of the order of 50 per cent on the basis of the last compiled figures (1989). The question we have to ask ourselves is: How much easier and more acceptable would it be to raise our present earnings differential between the craftsman and unskilled labourer to 50 per cent as compared with introducing some form of compulsion?

Chairman: But it must imply a thumping on-cost to your product.

Cheryl Gillan

5. I want to go back to the opening question and turn it around. To what extent do you feel that poor management is responsible for this shortage? We are not creating the demand for skilled labour. Perhaps management are giving the wrong signals to the education system. I see that you are nodding your head. I should like to know to what extent you feel that is a contributory factor. If there is a vicious

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circle here perhaps we should be paying more attention to managing demand rather than the supply sector of the education system.

(Mr Britton) I think that much of the behaviour of British industry can be understood as a perfectly rational way of operating in a system where training is deficient, that is to say, if British manufacturers seem to be rather reluctant to adopt new technologies and go for the high value-added products it is partly because they know from experience that they cannot get the labour force to do it. It is a vicious circle because the demand for training has to be there in order for the differential to open up which creates incentive for people to train. But I think it is too easy to say that British management are at fault. We have to understand the system within which British management operates. It may well be that given those circumstances they are behaving at least in their own interests, and perhaps nowadays that is what industrialists understand their main motivation to be: to maximise the profits of their firm rather than produce a skilled labour force which may be poached by other firms.

Mrs Campbell

6. I am interested in what you say about the response to management pressure. There are issues about how much the state should provide and how much industry should provide. I do not know whether you have any clear views about that in view of the response you have just made. Do you feel that more input from the state would help change attitudes and therefore supply industry with more skilled workers, which would have a knock-on effect?

(Mrs Steedman) I do not believe that it is helpful to pose the question in an "either/or" sense. Is it management or training? When you talk to managers in firms in Germany and, to a large extent, in France you realise that because they have grown up in a training culture where training has been the norm for perhaps 100 years they act in an entirely different way. They have a very good understanding of the relative value of different qualifications and how they can be put to the most productive use in the particular firm. It is very difficult to see how British managers can acquire that knowledge without being immersed in that sort of system. I would not want to try to revolutionise the way in which managers are trained because I think that would be to act in a vacuum. I would have preferred to try to establish the training culture and be confident that managers would act very differently once that had been established.

7. But are you saying that there has to be some initial impetus given to the training culture? If so, can it come from industry itself or does it have to come from government?

(Mrs Steedman) Professor Prais pointed to the way in which the French had created a very high demand for training in France which was entirely financed by the young people themselves and

government with hardly any contribution from industry. But we believe that has been achieved largely as a result of the very high differentials which are linked in collective agreements to recognised state-validated qualifications.

Chairman

8. Does that mean that the state sets the differential, or is it the manufacturer who sets it?

(Mrs Steedman) It has been entirely a matter for collective agreement between employers and trade unions.

9. So, manufacturer and trade unions in France can set those levels in the market?

(Mrs Steedman) Yes.

Dr Bray

10. Is there a danger of our trying to win the last war in the sort of training system that we are attempting to create? There has been a change in technology and a change in the relevance of particular skills and how skills interact with other qualities—such as team spirit, individual responsibility, initiative and independent-mindedness. There are very different skills apparent in an Indian bazaar, Chinese building society or African dance evening. Let us take the simple case of the skill of a typist compared with a modern word-processing operator. An efficient office worker will now be able to take a commercial software package and adapt it to the task in hand. That requires an entirely different set of attitudes and skills from that of a shorthand or copy typist. Are we in danger of creating technicians who are good at the sort of things that people were doing in the last generation and not the sort of things that will be required in the next?

(Mr Britton) I think I would answer that partly by going back to the point which was emphasised earlier about basic general training and the education that underlies it. Some knowledge of and familiarity with mathematics is necessary to skills of a wide variety. Familiarity with mathematical reasoning and precision of measurement is necessary for virtually any kind of skilled work. That is likely to continue to be necessary for new technology. In the very nature of things we cannot foresee what new technology will be. Therefore, trying to win the next war now is not an option open to us. We do not know the precise technology with which we will need to grapple in the competitive market of the future. What I am saying is that the more general the skills that one imparts the more likely they are to be of enduring value as technology changes. I think we have emphasised already that the responsibility of government is greatest for the general skills of the population as a whole and least for the very specific skills which have to be taught as a matter of on-going development by the employer himself.

11. There is quite a different pattern of skills in the factory today from the factory of 30 years ago.

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[Continued

[Dr Bray Contd]

Yet it seems to me that much of the concept of NVQs and so on is based on the factories of 30 years ago. You do not assemble satellites on a production line in Britain. You employ graduate electrical engineers. If you are putting together a car you have different sorts of workers. The most modern methods of car assembly, say at Nissan in Sunderland, are different from those at older plants in Japan. If you are responding to a very rapidly-changing work force and employment opportunity of the kind that we are facing, should we not think much more fundamentally of what training models to look for that can be adapted to our particular characteristics and comparative advantages, rather than trying to ape the German and Japanese practices of 30 years ago?

(*Professor Prais*) The question is often raised: can one leap-frog the whole procedure and cut out, from our school curriculum, basic practical subjects such as carpentry and technical drawing? All we can say is that there is a temptation to leapfrog in this country; when we go abroad we always ask that question. In secondary schools in Switzerland we have seen children of 12 producing excellent technical drawing on drawing boards. By the age of 14 they are working on CAD/CAM machines. We ask, "Is that old fashioned work on drawing boards really necessary?" They say, "Yes. We have a highly successful precision engineering industry of world renown. We think that it is essential at that age to begin with paper and pencil or ink". They have not been tempted to leap-frog. They constantly update their training courses; for example mechanics now learn electronics. But their system is based on the established notion that at 15 you have to reach a certain satisfactory school leaving standard and then follow it by three or possibly four years of training of the traditional apprenticeship sort, with one or two days a week at school. I fear that if we try to get there by leap-frogging we shall fail as we have in so many other policies.

Chairman

12. So, the basic skills remain essential?

(*Professor Prais*) At those ages, yes. We should begin them early and not cut them out and substitute general problem-solving skills, as we tend to do in our schools today.

Dr Bray

13. I want to explore how it operates in practice in a particular work force. Of a thousand steel workers made redundant at Ravenscraig, only 12 per cent opted to train for manufacturing skills. The others took training in service industries, heavy goods vehicle driving, warehouse management and other things. In those circumstances, would you say to those people, "You ought to equip yourself as a Nissan car worker or National Semiconductor assembly line worker"?

(*Professor Prais*) We are talking of people who have been made redundant half-way through their working lives. I think that that is a different problem from what we do for 15 to 18 year-olds.

14. There is an identical pattern of training preference in secondary school leavers. I am talking about an area of my constituency.

(*Professor Prais*) Presumably, it will be based on local offers of employment. We have gone very far down the road towards dismantling our manufacturing industry.

15. That is absolutely right. But we face the dual problem of having to create a new manufacturing industry whilst re-equipping people with skills. What is the combination of training and industrial development strategy? Do not the two have to fit together?

(*Professor Prais*) I think they do. There is an important distinction to be drawn between retraining and training school leavers *ab initio*. In our research work we have principally focused on the question of getting the underlying structure right—that is, the initial training. The retraining issue is a very difficult one, particularly in the case of those who do not have the basic mathematics at school.

Sir Trevor Skeet

16. For many years we have been used to clear demarcation in British industry between steel and coal and in other ways which has given the worker very limited experience. Is that due to trade unionism or the inability of management to control those in their employ? We have found in recent years that the foreign companies that have been brought in—Phillips Lighting from Holland, Nissan from Japan and others—do not seem to have these practices. Workmen of even average ability seem to be able to move forward and gain new experience. Is it a management or labour problem? Where does the responsibility lie?

(*Mr Britton*) It is in part a management problem and in part a problem of labour relations, but underlying it is the problem of the lack of an adequate framework of qualifications within which people's competence can be recognised by employers in a variety of different firms. If you have a situation where the competence of the craftsman is judged solely by his having served his time and being a member of the relevant union then associating particular jobs with union membership is a very poor substitute for associating particular jobs with the proper qualifications. I think that if we had had a tradition of publicly recognised and properly tested qualifications from the start the kind of demarcation dispute, of which we were all well aware, would never have become the feature of British industry that at one time it was. It is less of a problem now, but I believe that it is very intimately related to the problem of providing an adequate structure for technical qualifications.

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17. If the managers had gone to the Harvard Business School in the States, for example, and had come back with very aggressive ideas and implemented them and the workers were motivated at the factory in question they would probably want to get on and learn new skills and learn about technology. Is it not a management rather than labour problem?

(Mr Britton) I think that one has to address management, workers and government in thinking of the problems of the British economy. To say that this is a problem of management may nevertheless point to an underlying difficulty—that managers take the decisions and therefore in a sense they are the people who will naturally get the blame. But I think it is right to see the environment within which those decisions are taken. It may be that managers found at one time in the past that they had no alternative but to agree with the establishment of demarcation, which proved disastrous for British industry in the longer term. Perhaps to understand everything is to forgive, but it was a mistake. I agree that they should never have let it happen.

Lynne Jones

18. You seem to be distinguishing between two types of development of people's skills. One is narrow-based training that is specific to the task in hand, which seems to mean that the employer is faced with the cost of doing the training himself, and the other is more widely-based training to provide skills which are based on the individual having an incentive to develop a qualification so that he can adapt to changes in technology and processes and can move from one job to another. Therefore, either the worker has an incentive to do it or there is a laid-down qualification set by the state, perhaps even paid for by the state, which is a different way of generating that more broadly-based skill. I get the impression you are advocating that we should move towards more broadly-based training to equip people to be adaptable and develop as things change. It will be of interest to know how in recent years you believe we have changed between those different levels and skills. There have been pressures exerted from incoming Japanese companies and others for team-building and more flexible working. In recent years has there been an improvement and a move towards what you perhaps wish to see, and what has been the result? Have we created a framework to move further in that direction?

(Mr Britton) The impression I get is that the specific training in some firms is very well done when it has the clear incentive that it will win out in the competition if it can train people. A necessary part of being engaged in certain industries is that one has a continuous process of improving the training of one's work force. It becomes current rather than capital expenditure that has to be incurred every year. When we have conducted projects that have concentrated on firms that are known to be doing well we see very good practices in those firms as far as training for specific skills is concerned. They have

recruited people who have good general training. Our worry is that the general training of the total population compared with our continental rivals is so lacking. Obviously, it is not the successful firms that we worry about; it is the average and below that concern us. The same is true of the work force. The concern is over the training not of the high fliers but the average and below. This seems to be an historical defect of British industry.

19. Are you saying that the more successful firms are able to recruit the work force with broad skills on which they can build? If so, why is that?

(Mr Britton) That is right. Despite the deficiencies of the British educational system, there are a lot of school leavers who are very able and well motivated. They get recruited by the best firms, and those are the success stories. What worries us is the large number of people who do not fall into that category, will not be thought suitable for positions by the more ambitious firms and will drift into casual work or no work at all. That parallels very much the distinction that you are making between the general and specific training. British industry can provide specific training for those who have succeeded at the general stage, but the provision of general training for the population as a whole is not something which British industry can itself provide. It is the responsibility of the community as a whole and is something in which the Government are necessarily involved.

(Mrs Steedman) I think the original question was whether or not we had made progress. If we look at what we have been doing in youth training in the past two years, when young people have been obliged to follow NCVQ courses whilst undergoing youth training and have been expressly forbidden from studying the traditional City & Guilds qualifications, we can see that public money is being spent to give those people very narrow skills-based training which in no way corresponds to anything that we consider is necessary to raise the skills base in this country. Professor Prais has written extensively on the need for external assessments of qualifications. We have also stressed the need for a general assessment in the training of young people which will allow for progression and development at a later stage. To respond to the question whether we have made progress and where we have got to, we have most definitely gone backwards in introducing NCVQs as the only qualification funded publicly that can be studied for in youth training.

Mr Miller

20. Such narrow training takes us back to the demarcation argument. We can debate that chicken and egg argument all night, that is, whether at its inception it was a management or trade union tool. I think there is plenty of evidence to show that in the shipyards it was developed as a management tool to differentiate between a boilermaker and sheet-metal worker. It merely gauged the metal that they shaped. There was no difference in training; it just happened

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[Mr Miller Contd]

to be a convenient tool. That is an interesting reflection on history. What I am more interested in is what practice you have identified that has encouraged companies and organisations to break out of that mould. Have you identified any common threads? Is it simply due to a fear of going under, or has that been created by a complex interrelation between work force and management?

(Mr Britton) I think that it has been perceived in the 'eighties that the competitive environment means that one has to learn from what is happening in continental countries and Japan where the approach to skills and the employment of skilled labour has been so very different. In that as in many other areas the examples have been there for us to copy. I think that there has been a change in attitudes of trade unions as well as management. It may be that the change in management took place first, but there has also been a change in trade unions. They have come to see that the success of their members requires greater flexibility and willingness to learn new skills and cross traditional boundaries. There has been pressure in the market place that has led to enlightened self-interest.

21. But what you say is that that has happened despite government, who presumably have narrowed the training base?

(Mr Britton) I do not think that government went out of its way to narrow the training base. What happened in the case of the TECs was an understandable wish to ensure that the skills provided led to a rather narrow definition of what it was that industry wanted. There was also an involvement in TECs of larger companies rather than smaller ones. If there was a single firm that was in a strong position to influence the TEC it could ensure that the interests of that individual firm rather than the influence of the whole labour force in that area was the basis on which the courses were set.

Mr Powell

22. Are there any areas in the division of responsibility between the Department for Education and the Department of Employment that are causing difficulties at the present time that you wish to highlight and illuminate for us?

(Mr Britton) I do not think that we necessarily see it as a problem between departments. It is a question of the purposes that are being served by education policy generally; in other words, there is always a conflict in setting education policy between the general cultural development of the population and the more specific skills which are necessary for the economic life of the country. Part of the implication of our studies is that the economic benefit of education has not been given sufficient emphasis traditionally in this country in the design of education policy. Transferring responsibility from one Ministry to another may make a bit of difference in that respect, but I am sure that it is not enough.

Chairman

23. Let me put a quick question on the TECs, to which you have already referred. Do you think that with all the overlaps between education and training the TECs have helped to remove some of those problems? Are the responsibilities which were overlapping in your report in the 'eighties now somewhat less today? Do you think that the introduction of the TECs has helped to remove the overlap in the responsibilities for training which you identified in the 'eighties as being something which led to difficulty?

(Professor Prais) Overlap in responsibilities?

24. Yes. The research produced in the 'eighties indicated that firms were becoming confused by the roles of the TECs, the industry training organisations, education and training providers and the NCVQ. Some TECs were trying to set standards themselves. Is there still a confusion, or do you think that it is now more rational than it was?

(Professor Prais) I am not sure that I can answer that.

Mrs Campbell

25. A report earlier this year, for which Mrs Steedman was responsible, pointed out the difficulties and the responsibilities for administration and funding which were divided between local education authorities, the Department for Education, the further education funding councils and now the funding agency for schools. Do you think that that will create confusion in the provision of training and the strategic role of education?

(Mrs Steedman) I think that one of the problems that arises is that it is very difficult to see who is taking responsibility for important areas of policy. One of those is the guarantee of quality of training and training standards. I believe that NVQs are awarded by City & Guilds and validated by NCVQ. They are provided in colleges which until May of this year were funded by local education authorities. From May of this year they will be funded by the further education funding council. The teachers are paid by those authorities, but the TECs have played a very important role in providing some of the funding for those teachers' salaries. In this very confused situation the colleges are supposed to be encouraged to get their students through NCVQ qualifications by having 25 per cent of the funding of their colleagues withheld until those students pass. I was trying to explain that situation to some foreign visitors. They repeatedly asked me who was responsible for maintaining the quality and standards of those qualifications. With all those bodies concerned it is impossible to see who carries final responsibility. I think that that problems arises from having so many agencies involved.

26. Can you say something about training credits and the pilot schemes that the Government have been running over the past few years? I know that the idea of training credits was to try to put

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[Continued]

[Mrs Campbell Contd]

power into the hands of young people themselves. Perhaps it has not been as successful as was hoped in that respect. Do you see that as a way out of the confusion you have just described?

(Mrs Steedman) I am afraid that I have not seen any independent research on training credits and do not feel able to comment. I have seen only the Department of Employment's own evaluation.

Mrs Campbell: There is a rather good one by NATFHE that has been published recently.

Sir Trevor Skeet

27. We find that a number of European countries appear to get a lot out of their education systems, particularly Germany and France. Can one say that in the United Kingdom the employer is able to build on to the product offered to him by the school or college?

(Mr Britton) I think that the situation in this country is regarded as unsatisfactory by most employers. They find that when they take on young people they have to devote some of their own resources to making good the deficiencies in many secondary schools. Again, I think that the emphasis must be on the teaching of those of average ability and below, who account for more than half the population. If you compare the standards achieved in secondary schools, as in the case of mathematics—where it is quite straightforward to do so though less so in some other subjects—you will find that the average performance of the British school child lags a year or more behind the performance on the continent or Japan.

(Professor Prais) I think it is quite clear that when you go to the secondary modern-type school on the continent the objective of the school is to prepare youngsters for vocational training. The link between schooling and industry—employers—is much closer than it is here. Career guidance is much better and more explicit and is a more essential part of the last two years of compulsory schooling. Mathematical abilities have been referred to. Training in practical subjects, be it woodwork, technical drawing, electrical work or office work, is all carried through to a much more professional standard, that is, with the intention of leading youngsters into vocational training for two or three years.

28. Are you suggesting that more expenditure is necessary?

(Professor Prais) No.

29. As an observation, Japan has the lowest public expenditure per student and the highest educational outcome, and exactly the same seems to apply to the United States. We spend a lot on education but do not get the necessary results. Is it an organisational or money problem?

(Professor Prais) We do not believe it is a matter of money. If one looks at Switzerland, Germany or France and compare like with like there is no real difference—perhaps it may be one or two points—in the percentage of GDP spent on education.

Chairman

30. There must be a discernible element in the pattern. Is it parental motivation?

(Professor Prais) It is poor school organisation. How much time is wasted in a school and what is being taught? As far as mathematics is concerned, are you teaching arithmetic that everybody needs to know or are you filling children's time with rather general exercises in tessellations, counting the number of cars that pass outside the front door and so on? It is organised lesson time that is unsatisfactory.

Mr Batiste

31. I completely share your view that you have to be more focused in the type of thing you are teaching when you are considering a subject like mathematics. But it seems to me that part of the problem is that we specialise too much too soon and there is a more general need in the educational system for a more broadly-based pattern of teaching. Is that an accurate perception of the problem?

(Professor Prais) No. When one comes to vocational training under NCVQ one specialises too much. In schools we need a broad curriculum but the syllabus for each subject needs to be focused on things which are useful and can lead on to higher and more difficult topics.

Cheryl Gillan

32. Do you think that part of the equation points towards the way in which we train our teachers in terms of their management of the classroom and school time?

(Professor Prais) Undoubtedly there are great deficiencies there, but that in turn depends on what framework of teaching is provided for the teacher. At the moment, the national curriculum is very vague. In mathematics one of the statements of attainment is: 'make generalisations'. You will not find that anywhere on the continent; you will find multiplication of decimals.

Chairman

33. Is it a matter of precision?

(Professor Prais) It is precision and clearly defined tasks within each subject.

Cheryl Gillan

34. You are asking for a more detailed national curriculum?

(Professor Prais) A more specific one—leaving out a great many generalities which confuse teacher and pupil.

35. And an improvement of the training of teachers?

(Professor Prais) I am referring to training teachers suitable for an improved organisation of

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[Cheryl Gillan Contd]

schools. The tasks of the continental teacher are much more manageable than the tasks of the English teacher.

simply to treat the last couple of years in secondary school if you are not going to university as a complete waste of time.

Mrs Campbell

36. I want to ask about the divide between academic and technical and vocational education. That is something that has worried me for a considerable time. I note that the French manage to improve their vocational courses by bringing them into a Baccalaureate framework. At the moment, we have two totally separate systems for the post-16s: A-levels and academic courses and NVQs. Do you feel that bringing them together will help to raise educational standards in the technical and vocational sense and give people a feeling that they are more worthy and have more weight?

(Mrs Steedman) You are quite right about France. I tend to think that we have missed an opportunity to create a technical and vocational A-level to run alongside general A-levels. But that is precisely what the French have done. There is no pretence that the content of a vocational A-level is the same as that of a general A-level, and it is well understood that there is a hierarchy and that those who take vocational A-levels do so because they are not considered bright enough to do anything else. One has not overcome that division at a stroke. It is a very difficult, possibly an insoluble, problem. The fact is that these qualifications are very popular amongst young French people. The technical and vocational and general Baccalaureate are extremely popular. There are many more who wish to take them than are able to. Nevertheless, they will have 60 per cent of the age group obtaining Baccalaureate qualifications this year. By creating qualifications which are valued and given status one can improve the motivation of young people. I think that it must be very demotivating for young people in this country who have followed vocational courses to find that the qualifications they have worked hard to obtain have been abolished at the stroke of a pen. We keep doing it. We have abolished BTech (general); we have abolished BTech (first). There are hundreds of thousands of people holding these qualifications. I cannot see that gives anybody very much motivation to work hard for a qualification if he does not know whether it will be there next year, or in five years' time.

(Mr Britton) It is impossible to legislate for the status of a qualification; it depends on public esteem. Public esteem is won if someone is rigorously tested, and to have that piece of paper shows that you have learnt something. That is the first requirement. It should also be evident to people working on these courses that by obtaining these qualifications they improve their chances of getting good jobs. The motivation of people at the top of secondary schools on the continent is noticeably better. They see themselves as preparing for a specific job, or a class of job, whilst in this country there is a tendency

Chairman

37. Do you think that the introduction of the national curriculum will put right some of the deficiencies in education which you identified in your report in the 1980s?

(Mr Britton) We were certainly keen that there should be a national curriculum. Some of the problems that we identified in secondary schools when we began work in that area arose from a lack of a set curriculum and proper progression from one level to another. But it can now be said that in some areas the curriculum has become over-prescriptive and over-ambitious.

38. But, subject to the significant reforms you have advocated, at least it is a good idea to have such a curriculum?

(Mr Britton) My view is that we are better off with a curriculum than without one.

Mr Miller

39. Your comments about the curriculum being non-specific may well not be music to the ears of John Patten. You get 10 out of 10 from my daughter who is currently going through it. I want to press you a little further, taking the information technology block as an example. Do you mean that the problem with the particular block is that it seeks to teach a bit of basic physics, a bit of basic mathematics and a bit of information technology instead of leaving some of those very specific subjects to other parts of the curriculum, and/or do you mean that on things like information technology—which after all is supposed to be a vocational skill—the curriculum should not be wasted by tagging onto the end of it a written test as the means of examining people, which is taking pupils away from hands-on activities on computer equipment?

(Mr Britton) There should be an opportunity in technology to teach them to do things, not just to teach them what it would be like to do things. I think that it is the lack of practice and testing in practical skills which is perhaps the principal contrast between teaching technology here and on the continent.

40. For example, in the existing technology syllabus the pupil is introduced to the concept of original thought and then taken to design to application and evaluation. Those are all very valuable skills but you would not see them placed in those particular units. You would see them being evaluated in some other way?

(Mr Britton) I was talking about skills in a much more down-to-earth sense. For example, it is useful to learn how to plane a bit of wood.

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41. So, it is important to learn how to plane a bit of wood but it is not necessarily important for the same child at the same time to learn the cell structure of particular timbers?

(Mr Britton) I think that that is what I mean.

(Professor Prais) At the moment, national curriculum technology is meant to take up approximately one tenth of school time, and it has to follow a certain prescribed breadth. I am afraid that the lack of agreement on the provision of a sensible range of options for different types of pupil is so great that at present, in my personal opinion, it is better not to have technology in the national curriculum at all, but to allow free time for schools to provide what is sensible.

Chairman

42. In their own view?

(Professor Prais) In their own view or the views of their pupils. Up till recently we have had very sensible courses—technical drawings and so on. These cannot be taught under the present national curriculum. They have been abolished, which to me seems to be a great mistake.

Dr Bray

43. How far is it a question of curriculum or course content or a question of the relationship between the different professional cadres involved? If teachers are hostile to manufacturers you will have a very less productive relationship than if they both feel that they are part of the same team. There is a sense of hostility amongst many employers towards the education world. To a degree that is reciprocated. I do not find the same hostility in Germany or Japan.

(Professor Prais) I can only agree that there are inadequate links between the schooling system and subsequent employers. That starts in the Department of Employment, or the Department for Education.

Lynne Jones

44. We seem to have had a tradition of low expectations of the average and below average child. That did not seem to matter in the 'fifties or 'sixties when we just needed low-skilled people. We now realise what damage that is doing to our ability to compete in the world. Is that something which existed in other countries in the past, or have they always had high expectations of average and below average ability? Have they realised the need for greater skills and greater education for the whole population? Have they moved to provide those skills? Have they changed whereas we have not, or have they always done that? What lessons can we learn from the way they have adapted to the need for skills?

(Mr Britton) I think that the difference is a long-standing one. The craft traditions were fostered and developed on the continent and integrated into

the education system in a way that did not happen in this country. One may say that it mattered less at a time when there was unskilled employment available. I think that past generations were aware of some of those deficiencies. It may have been possible to get unskilled jobs, but they were not very nice ones and were not very well paid. I do not think it is an entirely new problem. It is perhaps now more likely to take the form of unemployment, that is, those unskilled jobs do not exist. We run the risk of having a large proportion of the population who are unemployable, which would not have been true a generation or so ago when it was possible to have a large unskilled labour force. Education and training has developed in the course of the century both here and on the continent. In many ways we have moved away from a skill-based economy and have undervalued some of the traditional skills that were present in the British economy in earlier generations.

Mr Batiste

45. One of the matters that has been praised is the quality of the provision for the most gifted children. There are high levels of achievement by those in universities. Equally, what we should be doing is achieving the maximum for the average and less gifted children. The knack is not to throw out the baby with the bath water but try to upgrade the skills of the average and below average without in the process losing the edge that we have got which many people in other countries admire. Other countries operate different technical and vocational schools to meet that gap. Do you think that kind of model for Britain would be better than trying to do everything in the same institution?

(Mr Britton) The actual organisation of the school is perhaps not the key issue. It is possible on other grounds to have a single school in the locality within which academic, technical and vocational education is conducted side by side. There may even be advantages in having a single organisation so it is possible for children to transfer from one provision to another. There are many different patterns on the continent. I do not think that there is any one single structure of education which alone works, but the tradition of technical education in this country is very weak and it is a great shame that the tripartite arrangement lost its third leg, that is, the technical education part of it.

Mr Powell

46. I want to return to the question of mathematics and the point that has already been made—which is well documented—that the average pupil in our schools is achieving less than is the case in Germany, Japan or most of our competitors. Can you help as to any reasons why you think that is so?

(Professor Prais) It has become embodied in the national curriculum but it goes back before that. If you go to a continental school the proportion of arithmetic in mathematics is very much higher than here.

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[Continued

[Mr Powell Contd]

47. Why?

(Professor Prais) The question is: Who sets the attainment objectives for schools?

Lynne Jones

48. Is it associated with low expectations of low-ability children?

(Professor Prais) I would not put it as simply as that. The main fact is that we have our mathematics curriculum set largely by professional mathematicians and professors of mathematics. It seems to me that that is a great mistake. Most pupils leave school not with the intention of becoming mathematicians but, say, becoming shop assistants or to do work in building where they have to do much basic arithmetic. For the professional mathematician arithmetic is of negligible importance within our present framework, altering targets in the national curriculum has become easier technically. We know what we want, but I fear as long as decisions remain in the present hands it will never be got right.

Mr Miller

49. Do you seriously want us to go away thinking that the one thing that needs to be done in order to upgrade mathematical skills for the generality of our pupils is that the mathematics curriculum should not be set by professors of mathematics?

(Professor Prais) I think that would be a tremendous start in getting it right. And if you get mathematics right, science and technology will come right by themselves.

50. The users and consumers of mathematics may be consulted on how it should be set?

(Professor Prais) More than that. They should have the overwhelming vote.

Sir Trevor Skeet

51. Would you consider that low achievement in the United Kingdom is probably due to low parental expectations and lack of support for study? Do you think that it is partly the responsibility of parents?

(Professor Prais) I am afraid I have to go back to arithmetic. Arithmetic is something that should lie within the capability of 90 per cent of school leavers. Because schools have failed in attaining that capability, teachers have attempted to fill up pupils time with a great many other mathematical topics which are beyond them. That approach to the curriculum has now become established. Parental low expectations have become conditioned by their

own unhappy experience of mathematics in school, or by the experience of their children or their neighbours' children.

52. What you are suggesting is that some of the causes of the problems are low aspirations by parents and also a lack of discipline in the home?

(Professor Prais) I do not want to deny any of that. But in the realm of practical policy we now have a national curriculum, and it lies in the hands of government to do what needs to be done. If more of those concerned with the details of policy saw the attainments of school children abroad they would get it right at source. It is in the primary school that the trouble starts.

(Mr Britton) What we have seen is that parents can be very readily enrolled on the side of vocational and relevant education if they see the difference in job opportunities for their children. In any reform of the education system it is clearly necessary to enrol the parents on that side.

Dr Bray: I have a question about the role of mathematics in the national curriculum. The problem about the school mathematics project was that it was set by a professor who refused to spend any of the very substantial income from the publication of the SNG books on evaluating the performance of people who went through the curriculum. It was not simply a failure of course specification but a failure of the overall administrative system in seeing what the effectiveness of the action was. If we apply your argument, there is no profession which is more in the hands of Philistines than accountancy. One can say that they are superbly trained in simple skills—and in greater numbers in this country than in any other. To what advantage is that to the British economy?

Chairman: It may be an advantage to the Inland Revenue!

Dr Bray

53. With respect, does one not want a very much better investigation of the overall system of structuring courses, subsequent performance, influence on working attitudes and so on?

(Professor Prais) As far as mathematics is concerned, I think that if those who set the national curriculum—and the Cockcroft Committee before that—had gone abroad and looked carefully at what was going on, they would not have come out with the present curriculum.

Chairman: I think that is a very fair answer and to the point. Thank you very much for coming here and answering our questions.

ISBN 0-10-020883-5

